Optimization of the extraction of bioactive compounds (phenolic compounds and glucans) from *Pleurotus ostreatus*

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During the last years, the demand for bioactive compounds from mushrooms was increased significantly within the food industry, contributing for bieconomy development. *Pleurotus ostreatus* are an important source of bioactive compounds, such as phenolic compounds and glucans. The main goal of this study was to optimize the extraction of bioactive compounds from *P. ostreatus* following an integrated approach to maximize extracted compounds.

Two aqueous extraction methods were studied (M1 and M2). In M1, a hot extraction was performed (extract M1) (90 ºC, 500 rpm) during 1, 2, 3, 5, and 10 hours. In M2, a room temperature extraction (extract M2A) followed by a hot extraction (extract M2B) (90 ºC, 500 rpm) of extract M2A residue was performed.

After the optimization of hot extraction duration, the chemical composition (total sugar, α and β-glucans, protein and ashes), the bioactivity and toxicity of extracts were evaluated. The antioxidant activity was determined by ABTS and ORAC methods. The antimicrobial activity was evaluated through the determination of the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) against three Gram-negative and two Gram-positive bacteria. The mutagenicity and cytotoxicity were evaluated by Ames and PrestoBlue assays.

Regarding the optimization of hot extraction time, in both methods, it was observed that extraction times higher than 1 h did not increase significantly the extraction yield and the amount of extracted phenolic compounds. Therefore, it was established that hot extraction would be performed for 1 h.

Chemical composition of extracts showed that they were an important source of protein (extract M1: 24.25% ± 1.15; extract M2A: 22.82% ± 0.21; extract M2B: 27.69% ± 1.18), α-glucans (extract M1: 21.10% ± 0.57; extract M2A: 15.30 % ± 0.75; extract M2B: 22.42 ± 0.30), and β-glucans (extract M1: 12.65% ± 1.67; extract M2A: 14.87% ± 2.30; extract M2B: 9.62% ± 3.23).

Comparing both extraction methods (M1 and M2), the results indicated that M2 was more effective than M1. The extraction yields (extract M1: 41.33% ± 4.29; extract M2A: 33,60% ± 0.39; extract M2B: 15.18% ± 0.7) and the amount of extracted phenolic compounds (extract M1: 6.49 ± 0.25; extract M2A: 5.57 ± 0.05; extract M2B: 2.53 ± 0.22 acid gallic equivalents (mg / g dry weight of mushroom)) were higher in M2.

All extracts showed antioxidant and antimicrobial activity against *Escherichia coli, Pseudomonas aeruginosa* and *Bacillus cereus*. The MICs varies between 5 and 40 mg / mg.